

Analysis of total hip replacement postoperative results in patients with different types of spinopelvic stiffness

ABSTRACT

This dissertation addresses the relationship between spinopelvic mobility and the outcomes of total hip arthroplasty (THA). It is based on the assumption that the biomechanical relationship between the hip joint and the lumbar spine plays a fundamental role in maintaining balance, functional mobility, and postural stability, while disturbances within this complex may limit the effectiveness of surgical treatment. Although the importance of the spinopelvic relationship has received increasing attention in the medical literature, there remains a lack of comprehensive analyses encompassing the full spectrum of clinical factors, functional determinants, and radiological findings.

The aim of this study was to evaluate the influence of different patterns of spinopelvic stiffness on the clinical, functional, and technical outcomes of total hip arthroplasty. It was hypothesized that restricted spinopelvic mobility increases the risk of mechanical complications and impairs postoperative adaptation.

The study included 105 patients qualified for total hip arthroplasty due to advanced hip osteoarthritis. Spinopelvic mobility was classified according to the criteria proposed by Kanawade, Vigdorchik–Luthringer, and Haffer. Radiological parameters (Δ APt, Δ SS, and PI–LL) were analyzed together with clinical outcome measures, including patient-reported disability assessed using the WOMAC, Harris Hip Score, and Visual Analogue Scale (VAS). Preoperative and postoperative outcomes were compared to evaluate the impact of spinopelvic mobility on functional recovery and complication rates. In addition, technical aspects of the procedure, including acetabular component positioning and leg length discrepancy, were assessed.

The results demonstrated that, regardless of the type of spinopelvic mobility, total hip arthroplasty resulted in significant clinical improvement, with marked pain reduction and enhanced functional performance in daily activities. Limited improvement was observed only with respect to sports-related activities, which remained below pre-disease expectations after treatment. Analysis of variance confirmed a strong effect of the procedure on pain reduction and improvement in overall well-being. Although differences between mobility patterns did not

significantly influence short-term functional outcomes, they proved to be important predictors of postoperative complications.

The overall complication rate in the study population was 19.6%. The highest risk was observed in patients with severe spinopelvic stiffness. In this group, the risk of hip dislocation, revision surgery, and malposition of prosthetic components was more than twice as high as in patients with normal spinopelvic mobility. Advanced age and the presence of comorbidities were identified as additional risk factors.

In conclusion, total hip arthroplasty is an effective treatment for patients with end-stage hip osteoarthritis. One of the key elements of preoperative planning in patients with impaired spinopelvic mobility is the selection of optimal acetabular component orientation. Achieving modified target component positions often requires appropriate adjustments to the surgical technique. In patients with marked spinopelvic stiffness, particularly in complex cases, the use of surgical navigation systems or intraoperative fluoroscopy should be considered. These techniques facilitate accurate reproduction of the planned acetabular component position despite altered spinopelvic biomechanics and anatomy.